2015

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Alexander Watkins
University of Colorado Boulder, Alexander.Watkins@Colorado.EDU

Rebecca Kuglitsch
University of Colorado Boulder, Rebecca.Kuglitsch@Colorado.EDU

Recommended Citation

Watkins, Alexander, and Rebecca Kuglitsch. "Creating connective Library Spaces: A librarian-student collaboration model." In Enhancing Teaching and Learning in the 21st Century Academic Library: Successful Innovations That Make a Difference, edited by Bradford Eden, 157-169. Lanham, MD: Rowman & Littlefield, 2015.

Creating Connective Library Spaces:
A librarian-student collaboration model

Alexander Watkins
Rebecca Kuglitsch

Libraries struggle to be relevant spaces that attract students yet are more than simple study halls. The library as a connective space is one solution. This idea is not just about providing study space or collections space or even their juxtaposition, but about coming up with innovative ways to harness their proximity. In this chapter, the authors will discuss how to begin developing such spaces by working with student design teams. The library wanted to develop spaces that foster both intentional and informal learning and are grounded in strong disciplinary identities for the sciences and the arts. The authors argue that this connection with students strengthened the vision for the spaces, made it easier to argue for changes, as well as providing benefits to the student participants. In this project, the library particularly hoped to harness the synergy between science, technology, engineering, mathematics (STEM), and art and design (which, when combined with STEM is known as STEAM) to develop spaces that promote an atmosphere of creativity. In both fields, creativity often occurs when the scientist or artist draws a new connection, when a striking pairing of two previously unrelated ideas suddenly comes together. Connecting users to the library's resources will facilitate informal learning activities: discovery, exploration, and self-directed research.

These spaces will support this connection-drawing, both within and between each space. They are high traffic, central spaces, occupying two broad symmetrical hallways that flank the central entrance of the main library. They are the main paths into the building for all entrants and funnel students deeper into the library regardless of their subjects of interest. For this reason, they are especially important, since in addition to inspiring students in their respective discipline

the spaces can highlight these two strong areas of the university for any current or prospective student, providing opportunities for informal learning. This initial division, too, can be used to informally enrich the education of science and art students by showing the strong connections between two disciplines often rhetorically positioned as opposites.

But how can the library achieve these connections? The answer was to forge more connections by working with a service learning project in a well-established technical writing course at the University of Colorado Boulder (CU). Students in this class form design teams to help local institutions solve problems. The class attracts students with backgrounds ranging from the hard sciences to human sciences to design. With budget and time constraints familiar to many libraries, and with a core principle of supporting student learning, leveraging this existing service-learning program was a perfect solution to the librarty's needs. Moreover, working with a student design team provided user-generated ideas that are a better fit for student needs than librarian-generated ideas. The authors suggest that other libraries redesigning their spaces will find working with a student design team useful—but also that working with the library was beneficial to the students. Hopefully, this experience may inspire other libraries to develop their own rich, intentional learning spaces in collaboration with the ultimate users of these spaces: students.

Literature Review

The project of developing intentional learning spaces that provide a place for students and visitors to engage with the sciences and arts draws from work in several fields. The literature on library spaces and on spaces that enhance informal learning in the disciplines informed the authors' approach to and goals for the redesigned spaces. The literature of service learning in

libraries and service learning as authentic learning inspired the connection to a technical writing class as a means to jump start the redesign.

There is extensive literature on intentional and informal learning in library, education, and subject specific fields. The redesign of the Art and the Science Commons brought together ideas about intentional space design in libraries with ideas about informal learning in both art and science disciplines. Libraries have generally defined intentional learning as the studying and group activities that take place in the library. On the other hand, both the art and the science fields use informal learning to discuss free-choice activities that generally take place entirely outside of the academic context. What the library hoped to do was expand the intentional learning taking place in library spaces to include the kind of informal subject and content learning that have become so important to science and art education.

There is a major question in library science literature about how librarians can design library spaces that encourage learning and how the success of new design projects can be assessed. Scott Bennett has worked toward a methodology of creating library spaces designed for learning (2003; 2009; 2011). He attempts to assess how well libraries are facilitating "intentional learning" wherein students take responsibility for high level skills, develop personally meaningful goals that include but also go beyond their own school work, and then self-assess their own learning (Bennett, 2011, p. 766). He identifies twelve activities that can measure some degree of intentional learning from the National Survey on Student Engagement ("NSSE Home," n.d.); however, NSSE's questions focus mostly on studying behavior, making it difficult to assess whether students are simply doing school work, or if they are truly engaging in intentional learning. Using assessment methods can also help align library informal learning with campus priorities for learning (Lippincott & Duckett, 2013). Harrop and Turpin studied students'

learning preferences and how it translated into space selection, once again focusing on studying and activities that center around coursework. They suggest developing a diversity of spaces that cater to the multitude of studying preferences (2013).

Learning activities are not just limited to studying or even necessarily related to the academic experience. They can include the kind of enrichment experiences that many people choose to engage in all the time; in this regard, informal learning can also be referred to as free-choice or everyday learning. There has been recent research and broad recognition especially in the sciences about the importance of informal learning. This movement has most importantly been catalyzed by the Learning Science in Informal Environments (LSIE) report, which argues that much of Americans' science learning comes from these non-school activities (Bell, Lewenstein, Shouse, & Feder, 2009; Falk & Dierking, 2010; Semmel, 2010). It is the engagement and fun of hobbies like amateur astromomy, places like science museums, or activities like visits to national parks, which make these informal learning activities so effective, even in some cases more productive than formal education (Falk & Dierking, 2010). Much of this research has focused on museum environments. According the IMLS response to the LSIE report, libraries have been inadequately studied for this kind of informal learning (Semmel, 2010).

Likewise in the arts, formal and informal learning have long been interrelated, due to the generally acknowledged enrichment potential of art museums, cultural actives and performances. There is a robust discourse around the educational potential of these informal learning spaces (Knutson, Crowley, Russell, & Steiner, 2011; Simpson, 2011; Unrath & Luehrman, 2009; Werth, 2010). Knutson et al. approach art education as an ecology that includes both formal and informal settings (2011). Each environment has unique affordances that can promote learning,

for example resources like art objects or studio space, and they argue that this diversity is especially important to arts education (Knutson et al., 2011, p. 311). The question then is how can librarians ensure that the library is part of a diverse learning landscape?

Libraries strive to not only be locations for studying and group work, but to become part of the informal learning ecosystems of both the arts and the sciences. Libraries have not yet been a major part of the conversation about informal learning in these disciplines, which often focuses on museums: art, natural history, and science. There is value in a diversity of venues for informal learning, however, and libraries should leverage their unique affordances, such as resources for deep self-directed inquiry to create informal learning environments. For example, a student's interest might be piqued at a science or art museum (or perhaps, by a library display or serendipitous browsing); the library's in-depth research resources can support their further exploration.

While the libraries at CU recognize and value informal learning, it is difficult to establish such spaces given the constraints of budget and lack of time that plague most libraries. One solution is working with classes that have service learning components. The potential of a partnership between the library and service learning has been sparingly but enthusiastically explored in the literature. It has often been used as a tool for achieving results the library might otherwise be unable to attain due to financial and staff constraints. Students can undertake projects that would simply be unfeasible for the library. For example, Northern Kentucky University was able to partner with marketing research classes and obtain good qualitative and quantitative research that would otherwise have been difficult to afford (Chesnut, 2011). Similarly, Cal State San Marcos worked with business students to develop a cohesive marketing plan as well (Meulemans & Fiegen, 2006). Cornell University's web team worked with student

programmers to develop a mobile site and iPhone app. These tools were recognized as important services, but ones that would require specialized skills and excessive staff time to develop; working with students allowed the university to meet the needs of users without monopolizing staff time (Connolly, Cosgrave, & Krkoska, 2010). In all of these cases, service learning allowed the library to develop programs and tools they could not otherwise provide.

Service learning partnerships can not only provide an opportunity to develop projects, but also allow libraries to better access user experiences and opinions. Unlike librarian-led assessment, service learning projects typically are performed by the library's users themselves. Brown-Sica that working with students "can provide data interpretation from a student's point of view that can aid in making evidence-based decisions," based on her experiences working with classes in architecture, human factors engineering, and civil engineering to develop plans redesigning the Auraria Library (2013, p. 276). Librarians at Eastern Washington University harnessed student expertise on the student experience in a similar way, by working with a technical communications course to promote RefWorks and assess its use (Meyer & Miller, 2008). The extremely positive results of their case study suggest that the user perspective of the technical communications students made their outreach particularly effective. Harnessing a service learning class provides libraries with authentic insights into their users' needs and experiences that librarians so often seek and so rarely find.

But while it is clear that libraries can benefit from service learning partnerships and related activities, what do students gain from service learning in the library? The pedagogical literature suggests that they can gain much. Service learning in particular provides a space to situate learning; this situated context in particular enhances retention and transfer (Booth, 2011, p. 40). Moreover, it offers an opportunity for authentic, engaged learning (King, 2004, p. 122).

Authentic learning is defined by Harrington, Reeves and Oliver as a constructivist approach rooted in situated learning and legitimate peripheral participation (2014, p. 402). In other words, authentic learning provides students with a real context and situation in which to exercise their skills as individuals learning to do something. Indeed, learning by doing is an approach most instructors support as highly effective, and is frequently cited as an approach that students prefer (Lombardi, 2007, p. 1). It gives students a way to take part in legitimate peripheral participation—learning to do something in an expert atmosphere. A classic example is Lave & Wenger's differentiation of learning physics in high school, where the community of practice is learning to become an adult who has graduated high school, versus learning physics in graduate school, where one learns to be a physicist (1991, p. 99). This participation makes authentic learning particularly effective and is an essential part of service learning . Lombardi writes "Students should know what it feels like for actual stakeholders beyond the classroom to hold them accountable for their work products" (2007, p. 9). Accountability from actual stakeholders was a key part of the redesign team, and this real, meaningful context for service learning supports engagement and learning. Ultimately, the authors believe that the redevelopment of the Science and Art Commons maximizes learning not only for the eventual users of the space, but also for the students who helped develop it.

Designing the Science Commons

There were several reasons to enhance the science areas at Norlin Library. First, while there are strong science branch libraries at CU, the main library is the flagship library on campus, and maintaining a presence in that space is a key to showing that science belongs with the humanities and social sciences as a part of the liberal education. The science areas are also

adjacent to high traffic areas on a campus with a seating shortage, making it particularly important to develop the area into a usable work space. Finally, the space is on the main campus tours, making ideal as a showcase for CU's scientific innovation. As universities like CU become increasingly tuition-dependent, it becomes increasingly important to clearly reinforce the strengths of the university.

At the initiation of the project, the space clearly did not fulfill any of these goals. It was oddly-shaped and awkwardly laid out, with a lot of wasted space and little identity. Although the words 'Science Alcove Gallery' were visible, and the science reference collection and print periodicals were available, they barely served to identify the space. Printers placed by the entry doors disrupted the flow of traffic, and large tracts of empty space were underutilized, providing little encouragement to study, work, or relax.

Librarians drafted a problem statement and identified the main goals for the space: to develop an appealing, usable space with a clear science identity that would support informal learning. After reviewing this, the student design team met with a small team of librarians interested in the science space. The group discussed goals for the space, problems the library had already identified, library constraints and capacities, and other projects that could serve as inspiration. With this background, the design team began to conduct further local research. They surveyed both students using the science space and tour group leaders that routinely led groups through the space in order to pinpoint stakeholder priorities. Using the survey information, the design team developed a basic plan for the space, and presented an oral report of their findings to the small group. This gave the library a chance to check in at a midpoint, request adjustments, further information, and check in to see if their suggestions were roughly viable. For example, students initially presented one single redesign plan. The library requested a tiered system of

suggestions, so any changes could be more gradually implemented, a structure better suited to the library's budgetary constraints. After this meeting, students refined their plan and developed a final report. In the final report, students recommended, roughly in order of priority:

- more study seating,
- lounge areas,
- student and faculty research displays,
- better layout,
- more artwork and more appealing décor,
- and potential development of interactive displays.

While budget constraints precluded implementing all of these suggestions, the tiered recommendations made it easy to prioritize and then implement relatively inexpensive solutions. The report was received in May; by the end of the summer, the science area was recarpeted, printers were relocated to avoid blocking traffic, an unused room's walls were demolished, leaving space to install couches and a lounge area, and the area was repainted. Without the student report, these relatively inexpensive but high impact changes would have been difficult to accomplish. This initial round of improvements left the area a pleasant, usable, but not distinctive space. Reducing the most overt issues with the space left the library free to focus on improving the space's identity over the following school year.

In order to identify the space as one focusing on science, librarians worked to find displays that highlighted the interplay between the library and the intellectual work of the university's scientists. A display of student work in the Science Commons was a relatively quick way to identify the space. One of the science librarians worked with another writing and rhetoric class where undergraduate students wrote academic scientific papers and paired them with a

poster designed to communicate the scientific argument visually and accessibly. Excerpts of the papers and citations to the works they relied on are displayed in the Science Commons with the posters, highlighting the library's online resources as foundations for very concrete student work. Another display is in development, this one contextualizing the life and writings of a well-known biologist who worked at CU.

Displays like these are good starting points, even as the library is working to establish long-term relationships with other units on campus that might furnish other meaningful displays in the future. The student report provided several possibilities for future collaboration, such as working with the campus's museum studies program or art faculty who explore connections between science and art. The library is also exploring grant possibilities for innovative displays and considering further ways to make the space comfortable but identifiable. Without student input, it would have been very difficult to jump start the low-effort, high-impact changes that allowed the library to focus on these larger questions.

Designing the Art Commons

The goal for the art area was to transform a high-traffic hallway that was simply book storage into one that could connect users to resources in order to encourage informal learning and real engagement with the library's collections. The area had several problems: a lack of aesthetic appeal for an area supposedly about art, a confusing and inaccessible layout, and it hid materials like art magazines that would be popular. The librarians hoped to reveal resources and collections by making the space more inviting, accessible, and logically organized. They aimed to add more student space in order to encourage users to spend time exploring the rich art collection.

After the success of the Science Commons' work with a student design team, the authors decided to work with the class again for a redesign of the arts section. The students were given the primary goals of:

- increasing and improving student study spaces,
- creating an attractive corridor,
- advertising library materials,
- and maintaining collections space and ensuring a logical stacks flow.

While the librarians wanted to add more student space, the library could not just be a study hall. Instead it needed to connect students to the things that make a library: vital physical collections, digital assets, and expert faculty librarians. These are the unique resources that can enable free-choice enrichment for informal learning. This was especially important as the collection is not just used by scholars seeking to write research papers, but also by aspiring artists and architects looking for inspiration.

The student design team met several times with the Art & Architecture Librarian, discussing his hopes for the space, the problems the library had already identified, and some of the project constraints. The team surveyed users of the space to find out what new features they desired and what they were most dissatisfied with. The students gave a presentation on their ideas, where the librarians gave feedback that was incorporated into the final design consultation.

The student team came up with a two-phase recommendation. The idea that came through most strongly was that the art commons should have a unique identity; that it should be clear that the user is in the part of the library dedicated to creativity, design and aesthetics. They proposed several plans that would give the commons a coherent identity and connect users and library resources:

- displays of architecture models and student artwork along the long hallway wall,
- magazine displays around a lounge seating area,
- turning shelves to 45 degree angles to improve flow and to create a distinctive look,
- new creative group study areas with whiteboard walls,
- a quiet study area with better lighting, closer to the windows, and with more power outlets.

The student report was immensely helpful because they had the time and dedication to really think about the space and to survey users. Because of this they were able to come up with creative ideas about creating an identity for the space. Having this data to back up suggested changes made it easier to advocate for improvements. As a result of this advocacy, a lounge with magazine displays is being implemented, and plans have been drawn up for further changes when money is available.

Informal Learning in the Art & Science Commons

The authors envision two complimentary spaces for art and science, designed for informal learning, that could bracket the wide spread of the library's educational mission. By pairing these two disciplines, the broad spectrum of knowledge contained within the library is symbolized, with the College of Arts & Sciences, the largest college of the university. Mirroring art and science initially positions them as opposite poles, but somewhat paradoxically can also serve to bring them closer together. Through a shared atmosphere of creativity, these spaces can highlight the similarities between the disciplines. While creativity is commonly acknowledged as a foundation of the arts, it is less explicitly seen as a key to the sciences. The similarities can be seen in the language used to describe a piece of art and a good scientific idea: an experiment is

elegant, an observation is beautiful, a graphed curve is graceful. This suggests that science and art are not so far apart, that creativity and experimentation go hand in hand, and that STEM is really STEAM. Working with the student design team brought the library closer to achieving this goal. For example, the student team suggested that the science librarians work with faculty and students in the art department and in the Technology, Arts and Media program to obtain artworks for the space that relate to and explore the sciences.

A major goal of each space is to connect users with the library, revealing the library's vital role in the research process by advertising the collections to the many patrons that use the library's major through-ways. The redesigns aim to create spaces where users interact with the unique resources and services of the library. Librarians strive to seamlessly supply users with resources, yet success in providing easy access can obscure the library's role in research. The Ithaka Report suggests that faculty in general, and faculty in the sciences in particular, view the library primarily as a buyer of content (Housewright, Schonfeld, & Wulfson, 2013, p. 66). This understanding of the library and the library's role in education is painfully limited, eliding many of the services libraries offer. The student suggestions to aesthetically display the art magazines or develop data visualizations of CU-based research reveal the library's resources as existing within a flow of print to digital, as do some of the simple displays already implemented. All of these displays emphasize the libraries' key role as a place for the creation of new knowledge.

As well as highlighting the role of the library, one of the most important goals for these redesigned spaces was that they promote both intentional and informal learning. The library wanted the spaces to foster studying, collaborations, and other course-focused work. But the spaces should also be hubs for the kind of informal learning that is so important in arts and science education, locations that leverage library resources to provide free-choice opportunities

to engage and dive deeply into these subjects. The Science Commons can increase general scientific literacy by making science visible, accessible, and simply fun to students regardless of their major. Only about 30% of Americans take college-level sciences courses (Falk & Dierking, 2010, p. 486). Yet if the goal of the university is to produce well-educated and well-rounded students, enticing non-science students into understanding science is especially important. Moreover, by bringing together resources from across the sciences, the space can also promote interdisciplinary research in the sciences, which is becoming increasingly important. The art commons can leverage its unique resources to provide a place to explore the arts through structured research but also through casual reading, browsing, and serendipitous discovery. This is an exploration different from but complementary to that of museums or art studio spaces. The library can be a key niche in the ecosystem of informal learning, and can help produce students who value multiple ways of knowing and exploring their world.

Service Learning in the Redesign Process

CU is lucky to have a robust educational infrastructure for collaborative opportunities. To develop these spaces, librarians worked with students in an upper division technical communication and design course to develop the plans. Writing 3035, a technical writing course in the College of Arts & Sciences' Program for Writing and Rhetoric focuses on client projects. In the class, students work on a project for a campus or community client over the semester and present them with a final design product. The library has well-established relationships with the faculty members who teach the class, so librarians were readily able to work with them. It is likely that librarians at many universities have similar service-learning or experiential learning

courses available to them, and the authors encourage them to seek these opportunities out for several reasons beyond the library's needs for innovative, student-generated ideas.

The collaborative partnership between this class and the library benefits students and aligns with the goal of supporting authentic learning across the university. Service learning projects like this class and the redesign project quite clearly fit most of the criteria for such learning. With the goal of supporting student learning on campus, it made sense to work with such a course, which so strongly supports learning in a context that reflects a real situation and authentic assessment. Likewise, the emphasis on multidisciplinary approaches and accountability to multiple stakeholders is a perfect fit with the ideals of authentic learning (Lombardi, 2007). The students were accountable to the library, as their client, but also to each other as team members and the user population for whom they were designing. They had to investigate whether the library's goals matched the actual needs of the users of the spaces and communicate if they did not. They had to balance the needs of students with the realities of a tight library budget. Students on the redesign teams not only learned about technical communication, both formal and informal, but practiced it. They were not designers, but they learned to participate in a design community. This learning is situated in a natural and authentic context—and one that allows them to have a visible impact on a community they participate in. The client projects are not mere facsimiles of a real situation, but allow students to work with a real need and offer real solutions that they could, in some cases, see put into place immediately. It is clear that supporting classes like this is part of the library's mission.

Beyond this, service learning involving the library and this project in particular also improved students' understanding of what the library has to offer. The intensely situated learning meant that students on library design teams could not help but learn more about the library.

Students who participated in the redesigns mentioned their surprise at the array of services and materials the library provides. While each redesign team was only a small group, that group learned about the library's purposes, goals, and user-focused mission. A challenge for libraries is demonstrating to students that they are more than simply a place for finding books. The students' work to meet the goals for the space helped expand their perspectives on what the library provides. This new-found knowledge will likely be shared with their peers, and these peer-to-peer communications are particularly effective.

Conclusion

Based on this experience, the authors argue that service-learning programs are a mutually-beneficial model for librarian-student collaboration. The library gained invaluable insight and ideas for redesigns, while the students had a meaningful project that also exposed them to the goals, ideals and services of the library. Through working with student design groups the library was able to contribute to students' authentic learning experiences. By leveraging students in service learning classes, the librarians were able to obtain a user perspective on implementing connective library spaces.

These projects supported the goal of creating spaces that would bring users and resources together to enable and promote informal learning behaviors: curiosity, discovery, and exploration. These spaces will help place the library into the ecosystem of informal learning in science and art by allowing for the discovery of new interests through interactions with collections, exhibits, librarians and peers. The library plays a unique role in informal learning which the new designs will enhance by connecting learners to resources for in-depth, self-directed learning through research.

The spaces are meant to make multiple connections, between librarians and students, between students and resources, and between disciplines. Especially important to these spaces was the pairing of science and art; bridging these areas suggests the creativity inherent in science and the rigor necessary for art. These two subjects can encompass the breadth of the library's resources, and place both as central to a liberal education in the 21st century.

The 21st -century library is a connective space, one that inspires as well as informs. It will take experimentation and initiative to achieve this vision, but this process can be sustainably carried out through collaboration with service learning programs. Such a library has an integral role to play in students' intentional and informal learning, a role that is absolutely vital.

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